

PERFORMANCE SPECIFICATION SHEET

CABLE, FIBER OPTIC, SINGLE (ONE) FIBER, CABLE CONFIGURATION TYPE 2 (OFCC), TIGHT BUFFER, CABLE CLASS SM AND MM

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-PRF-85045.

CLASSIFICATION:

Fiber optic cable configuration type: 2 (OFCC)

Fiber optic cable class: MM (graded-index, glass core and glass cladding, multimode)

SM (dispersion-unshifted, glass core and glass cladding, single-mode)

DESIGN AND CONSTRUCTION:

Fiber: Class MM fibers shall be in accordance with MIL-PRF-49291/6.

Class SM fibers shall be in accordance with MIL-PRF-49291/7.

Buffer diameter: $900 \pm 50 \mu\text{m}$

Finished cable:

Dimensions and configuration: See [figure 1](#).

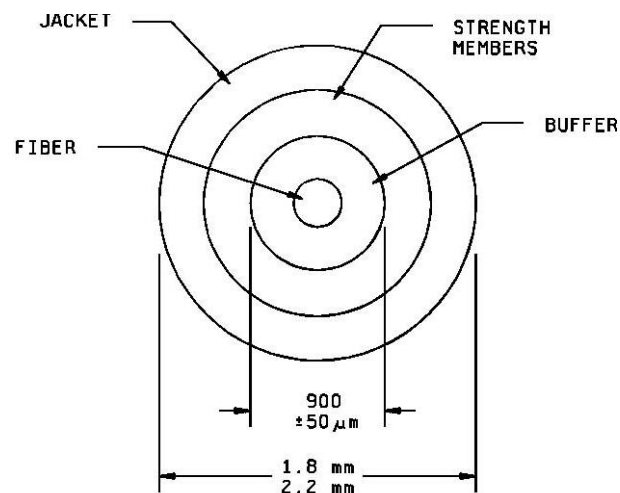


FIGURE 1. Tight buffered single fiber optical cable.

Mass per unit length: $\leq 15 \text{ kg/km}$

Color: Slate for Class MM fiber. Yellow for Class SM fiber.

Jacket material: The jacket shall be composed of a low halogen, low smoke, low toxicity polymer material.

Number of fibers: One

Concentricity: >0.8

Short-term minimum bend diameter: Eight times the cable outer diameter. (The short-term minimum bend diameter is to be used in all environmental and mechanical tests which specify a cable minimum bend diameter.)

Long-term minimum bend diameter: Sixteen times the cable outer diameter.

Minimum continuous length: The minimum continuous length of all cables shall be not less than 0.5 km. If lengths less than 0.5 km are specified in the purchase order, a conformance inspection shall be performed on test specimens not less than 0.5 km in length from which the purchase order lengths are cut.

PERFORMANCE REQUIREMENTS:

Optical properties:

Maximum attenuation rate: 4.5 dB/km at 850 ± 20 nm, 2.0 dB/km at 1300 ± 20 nm for Class MM fiber.
1.0 dB/km at 1310 ± 20 nm and 1550 ± 20 nm for Class SM fiber.

Change in optical transmittance: Measurements shall be made at 1300 ± 20 nm.

Crosstalk: Not applicable.

Mechanical properties:

Tensile loading and elongation: Applicable, tensile loading >270 N

Operating tensile loading: Applicable.

Dynamic bend: The tensile load shall be not less than 90 N.

Cyclic flexing: 500 cycles at 25 ± 2 °C and 100 cycles at -28 ± 2 °C. Change in optical transmittance measurements are to be made every 100 cycles for the 500-cycle exposure and every 25 cycles for the 100-cycle exposure. Each change in optical transmittance measurement shall be performed with the test specimen in the same position in the test cycle. The cycling may be halted to perform the change in optical transmittance measurement.

Crush: The test load shall be 250 N at a rate of 250 N/min.

Cable twist-bending: 500 cycles at 25 ± 2 °C and 100 cycles at -28 ± 2 °C. The test load shall be 10 N. Change in optical transmittance measurements are to be made every 100 cycles for the 500-cycle exposure and every 25 cycles for the 100-cycle exposure. Each change in optical transmittance measurement shall be performed with the test specimen in the same position in the test cycle. The cycling may be halted to perform the change in optical transmittance measurement.

Radial compression: Not applicable.

Impact: Not applicable.

Cable jacket tear strength: Applicable, except the cable jacket tear strength shall be not less than 35 N/cm of jacket thickness for standard performance cable.

Hosing: Not applicable.

Dripping: Not applicable.

Environmental properties:

Temperature range:

Operating: -28 to 65 °C

Nonoperating: -40 to 70 °C

Storage: -40 to 70 °C

Temperature cycling: Change in optical transmittance measurements may be made periodically. At a minimum, one optical transmittance measurement shall be made over a period of 1 hour at the end of each temperature plateau.

Thermal shock: Applicable, except perform at the operating temperature extremes.

Temperature humidity cycling: Change in optical transmittance measurements may be made periodically. At a minimum, one optical transmittance measurement shall be made at the end of each temperature plateau.

Storage temperature: Applicable.

Weathering: Not applicable.

Fluid immersion: Not applicable.

Flame extinguishing and smoke generation: Not applicable.

Flaming smoke generation: $D_m < 225$ when tested in the flaming condition in accordance with ASTM E662. The size and configuration of the test specimen shall conform to the 76- by 76-mm (3- by 3-inch) square specified in ASTM E662. The thickness of the test specimen shall be 2 mm (0.08 inches). The specimen shall be constructed by laying 76-mm (3-inch) lengths of OFCC adjacent to one another to form a 76-mm (3-inch) strip. Wire or cable clamps may be used to permanently hold the OFCC lengths in place. Longer OFCC lengths may be used if the top or bottom clamps are used to hold the OFCCs. If top or bottom clamps are used, the length of OFCC exposed outside of the clamp(s) shall be 76 mm (3 inches).

Shock: Not applicable.

Paint susceptibility: Not applicable.

Electromagnetic effects: Not applicable.

Chemical properties:

Halogen content: <0.2 percent

Part or identifying number (PIN):

M85045/16-01 (Multimode)

M85045/16-02 (Single-mode)

Qualification and conformance inspection: See [table I](#). (Note: Preconditioning. If preconditioning is required, it shall be performed as part of cable fabrication process and supplied already preconditioned. No preconditioning shall be performed as part of qualification).

TABLE I. Qualification and conformance inspection.

Group	Qualification inspection	Requirement paragraph	Test paragraph	Cable length ^{1/ 2/ 3/ 4/}	Conformance inspection
I	Visual and mechanical inspection	3.4, 3.9, 3.10	4.7.2	3 samples, 0.5 km each ^{5/}	A
	Attenuation rate	3.5.1	4.7.4.1	3 samples, 0.5 km each ^{6/}	A
III	Temperature cycling	3.7.1	^{7/}	2 samples, 0.5 km each ^{6/} (1 on reel, 1 off)	C
	Temperature humidity cycling	3.7.3	4.7.6.3	2 samples, 0.5 km each ^{8/}	C
	Low temperature flexibility (cold bend)	3.6.3	4.7.5.3	2 specimens, 8 m each ^{9/}	B
	Cyclic flexing	3.6.4	4.7.5.4	6 specimens, 5 m each ^{10/} (2 specimens at each temp)	--
	Crush	3.6.5	4.7.5.5	2 specimens, 5 m each ^{9/}	--
	Temperature life (life aging)	^{7/}	^{7/}	2 specimens, 300 m each ^{9/}	C
	Tensile loading and elongation	3.6.1	4.7.5.1	2 specimens, 150 m each ^{11/}	C
	Operating tensile loading	3.6.1.1	4.7.5.1.1	2 specimens, 150 m each ^{12/}	C
	Fungus resistance	3.8.4	4.8.4	2 specimens, 0.5 m each ^{9/}	--
	Cable element removability	3.6.18	4.7.5.18	2 specimens, 0.5 m each ^{9/}	C
	Flammability (60-degree angle)	3.7.12.1	4.7.6.12.1	2 specimens, 6 m each ^{9/}	C
IV	Thermal shock	3.7.2	4.7.6.2	1 specimen, 0.49 km each ^{6/} (on reel)	--
	Jacket self-adhesion or blocking	3.7.11	4.7.6.11	1 specimen, 30 m ^{13/}	--
	Dynamic bend	3.6.2	4.7.5.2	1 specimen, 150 m ^{14/}	B
	Corner bend	3.6.9	4.7.5.9	2 specimens, 5 m ^{15/}	--
	OFCC kink	^{7/}	^{7/}	2 specimens, 1 m ^{15/}	--
V	Cable jacket tear strength	3.6.14	4.7.5.14	5 flat extruded jacket material strips ^{16/}	C
	Cable jacket material tensile strength and elongation	3.6.15	4.7.5.15	5 specimens ^{17/}	--
	Flaming smoke generation	^{7/}	^{7/}	1 specimen ^{18/}	C

TABLE I. Qualification and conformance inspection – Continued.

Group	Qualification inspection	Requirement paragraph	Test paragraph	Cable length ^{1/ 2/ 3/ 4/}	Conformance inspection
VI	Acid gas generation	3.8.1	4.8.1	1 specimen, 1 m ^{19/}	C
	Halogen content	3.8.2	4.8.2	1 specimen, 1m ^{19/}	--
	Toxicity index	3.8.3	4.8.3	1 specimen, 1 m ^{19/}	C

NOTES:

- ^{1/} Tolerance on 0.5-km length is ± 5 percent, provided that results are normalized to 1 km.
- ^{2/} Tolerance on shorter lengths is ± 5 percent.
- ^{3/} A sample is the initial 0.5-km cable length.
- ^{4/} A specimen is a cable length that is cut from the initial 0.5-km cable length (i.e., the sample) or is cut from a longer previous cut length (i.e., cut from a longer specimen).
- ^{5/} The visual and mechanical inspection shall only be conducted on a 2-m section of each sample.
- ^{6/} The same samples as used in the visual and mechanical inspection shall be used.
- ^{7/} As stated under the applicable tests in this specification sheet.
- ^{8/} The same samples as used in the temperature cycling test shall be used.
- ^{9/} A specimen cut from each sample used in the temperature cycling test shall be used.
- ^{10/} Three specimens cut from each sample used in the temperature cycling test shall be used.
- ^{11/} A specimen cut from each specimen used in the temperature life test shall be used.
- ^{12/} The same specimen as used in the tensile loading and elongation test shall be used.
- ^{13/} A specimen cut from the specimen used in the thermal shock test shall be used.
- ^{14/} A specimen cut from the specimen used in the thermal shock test or one of the specimens used in the tensile loading and elongation test shall be used.
- ^{15/} Specimens cut from the specimen used in the thermal shock test shall be used.
- ^{16/} Flat extruded jacket material strips (i.e., strips of flat extruded material with the same composition of the cable jacket and of sufficient dimensions in which dumbbells can be cut) prepared as specified in 4.7.5.14 cited method and obtained from flat extruded material that underwent the thermal shock test shall be used.
- ^{17/} Flat extruded jacket material as specified in 4.7.5.15 shall be used in this test.
- ^{18/} Use 76-mm (3-inch) lengths of cable adjacent to one another to form a 76-mm (3-inch) strip. For a 2-mm (0.08-inch) diameter cable, an approximate length of 3 m is needed.
- ^{19/} A specimen cut from one of the samples used in the temperature cycling test or specimen used in the thermal shock test shall be used.

Qualification and conformance inspection by similarity:

Manufacturers who produce products for MIL-PRF-85045/17 or MIL-PRF-85045/18 and this specification sheet, are qualified under MIL-PRF-85045/17 or MIL-PRF-85045/18, and whose product produced to this specification sheet passes the tests and inspections specified in [table II](#), are qualified under this specification sheet. This qualification by similarity is applicable if the product produced to this specification was used in the production of the already qualified product under MIL-PRF-85045/17 or MIL-PRF-85045/18. Testing may be performed on a single length of cable, with a minimum length of 0.5 km.

TABLE II. Qualification and conformance by similarity.

	PIN	M85045/16-01 ^{1/}	M85045/16-02 ^{2/}	Conformance inspection ^{3/}
Group	Inspection			
I	Size inspection	X	X	A
	Attenuation rate	X	X	A
III	Temperature cycling	X	X	C
	Low temperature flexibility (cold bend)	X	X	B
IV	Thermal shock	X	X	--
	OFCC kink	X	X	--
V	Flaming smoke generation	X	X	C
NOTES: ^{1/} Where manufacturers are qualified for MIL-PRF-85045/17-01 or MIL-PRF-85045/18-01. ^{2/} Where manufacturers are qualified for MIL-PRF-85045/17-02 or MIL-PRF-85045/18-02. ^{3/} All conformance tests required for all qualified PINs.				

Intended use: This cable is intended for use as jumper cordage and pigtails for fiber optic components. This cable is intended for use inside of protected enclosures and is not intended for installation in the overheads or cableways.

Bandwidth measurements (multimode only): For this cable construction, the bandwidth is measured as part of the requirements of the optical fiber to be cabled. The bandwidth value does not change once the optical fiber is cabled. Since the bandwidth is provided as one of the cable measured parameters, the acceptable bandwidth for the optical fiber used in this cable (and by extension, the cable) is provided for informational purposes.

Bandwidth (multimode cables only):

For cable with MM: 62.5/125 micron fiber: ≥ 200 MHz-km at 850 ± 20 nm, ≥ 500 MHz-km at 1300 ± 20 nm for cable with MM fiber.

CHANGES FROM PREVIOUS ISSUE: Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:

Army – CR
 Navy – SH
 Air Force – 85
 NASA – NA

Preparing activity:

Navy – SH
 (Project 6015-2012-013)

Review activities:

Army – AR, AV, MI
 Navy – EC, YD
 Air Force – 02, 19, 70, 99
 DLA – CC

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.